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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,276	06/14/2002	Wei Yun Yau	Q68490	9289
23373	7590	08/31/2005	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			STREGE, JOHN B	
			ART UNIT	PAPER NUMBER
			2625	

DATE MAILED: 08/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/049,276

Applicant(s)

YAU ET AL.

Examiner

John B. Strege

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/28/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The preliminary amendment filed 6/14/02 has been entered in full. Currently claims 1-19 are pending in the instant application.

Claim Objections

2. Claims 11-13 are objected to because of the following informalities: The claims 11-13 are method claims which depend upon the apparatus claim 1. The claims should be rewritten in independent form by copying the limitations of claim 1 into the corresponding parts of the claims 11-13. Appropriate correction is required.

Claim 11 is further objected to because of the following informalities. On line 1 the limitation "a method f" should be replaced with --a method of--.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6, and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borza USPN 5,778,089.

Claim 1 discloses a fingerprint sensing apparatus comprising a number of packaged semiconductor devices, each packaged semiconductor device comprising a single fingerprint sensor die, each die comprising a sensing array surface, and the packaged semiconductor devices being arranged so that the sensing array surfaces of the dies define an apparatus sensing surface.

Borza discloses a fingerprint sensing apparatus comprising an exemplary array of four dies (note this is not limited to four) for sensing a single fingerprint, each die comprising an array of sense elements for sensing the presence of a fingerprint ridge upon the device (col. 6 lines 1-21). Each pad occupies an area of approximately 0.4 inches by 0.4 inches (col. 4 lines 56-60).

Borza does not explicitly disclose that the apparatus sensing surface comprises a number of packaged semiconductor devices. However Borza does disclose that there was a problem in the prior art of using a single large matrix array because they were fragile and costly due to low manufacturing yields (col. 2 lines 13-43). Thus Borza discloses using multiple dies of smaller sensing surface areas to achieve a more resilient apparatus. Thus similar to the instant application Borza discloses using a series of smaller dies (the dies being the building block of the invention) to achieve a larger surface area. It would be obvious to one of ordinary skill in the art that these series of dies could be achieved using several different semiconductor devices made up of one die each since it is a building block approach, however it would be more economical to use the method of Borza to put all of the semiconductor dies on the same device and thus simplify the processing of the device. The Applicants state that the advantage of their invention is that the size of the area of the apparatus sensing surface can be configured relatively easily by increasing or decreasing the number of semiconductor devices, however Borza invention also discloses the same advantage in that a larger array of dies could be used to image palms or larger arrays as desired (col. 6 lines 58-67).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a series of semiconductor devices to form the array of dies. One of ordinary skill in the art, furthermore, would have expected Applicants' invention to perform equally well using a series of dies on the same semiconductor device because it fulfills the same purpose and furthermore would result in less production costs. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Borza using a building block approach to obtain the invention as specified in claim 1.

Regarding claim 2, as seen in figure 5a the sensing surface is substantially planar.

Regarding claim 3, although Borza only discloses a two dimensional array, it would be obvious that if the surface area required was not large then a one dimensional array could be used thus making the device more economically suited to the purpose.

Regarding claim 4, Borza discloses that the sensing array is two dimensional as seen in figure 5a.

Regarding claims 5-6, Borza discloses that the sensing pads (sensing array surfaces) are approximately 0.4 inches by 0.4 inches. This converts to approximately 10mm by 10mm. Furthermore this is only limited by the current technology regarding the production of dies (col. 2 lines 40-43), thus it is obvious that as the technology improves to make the dies small then the smaller dies could be used.

Claim 14 is similar to claim 3 thus the same argument used for claim 3 applies to claim 14.

Claim 15 is similar to claim 4 thus the same argument used for claim 4 applies to claim 15.

5. Claims 7-10, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borza USPN 5,778,089 in view of Tartagni et al. USPN 6,114,862 (hereinafter "Tartagni").

Claim 7 discloses a ground contact located between the sensing array surfaces of the adjacent devices. Borza discloses that the dies (as seen in figure 1) contain a ground ring 15 however does not explicitly disclose that they are located between the sensing array surfaces.

Tartagni discloses a fingerprint sensor array (figure 13) in which ground rings 89 are shared by adjacent sensor cells 2 to produce a grounding element grid 112 (col. 10 lines 20-23). This provides the advantage of giving a discharge path for electrostatic discharge.

Borza and Tartagni are analogous art because they are from the same field of endeavor of capacitive fingerprint sensors.

At the time of the invention it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Borza and Tartagni to disclose a ground contact in the form of a grid thus locating the ground between the adjacent sensors. The motivation for doing so is that it would provide an adequate discharge path. Thus it would have been obvious to one of ordinary skill in the art to combine Borza and Tartagni to obtain the invention as specified in claims 7-9.

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Regarding claim 10, it is well known that the ground contact must be above the level of the sensing array surface in order that it make contact with the finger thus the Examiner declares official notice.

Regarding claim 16, as disclosed Tartagni discloses a grid.

Claims 17-19 are similar to claim 10, thus the same arguments used for claim 10 apply to claims 17-19.

6. Claim 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borza USPN 5,778,089 in view of Campbell USPN 6,133,957.

Borza discloses adjacent sensing surfaces that are separated by small gaps, thus a complete image of the fingerprint would necessarily have gaps between the image sensors. Borza does not explicitly disclose determining the direction information at the edge of the sensing region and then interpolating based on the direction information to fill in the gap however it would be obvious to do so.

Campbell discloses an interpolation method that measures the variance between sets of one or more pixels (step s20 of figure 2, paragraph bridging cols. 2-3, an edge is a place where the variance is high) then the direction information of the pixels is obtained in order to interpolate and thus increase the resolution of an image (step s30 of figure 2, col. 4 lines 39-53). This allows for increasing the resolution of an image in a manner in which artifacts are minimized (col 1 lines 55-61).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Borza with the interpolation technique as disclosed by Campbell to fill

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in the gaps of the fingerprint image and allow a complete image. The gaps occur at the edges of the sensor regions thus it would be logical that the direction sections are taken at the edges. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Borza and Campbell to obtain the invention as specified in claims 11-12.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Borza USPN 5,778,089 in view of Hutchison et al. USPN 4,149,420 (hereinafter "Hutchison").

Claim 13 further specifies the apparatus of claim 1 (rejected over Borza) to obtain two sets of fingerprint image portions at different offsets and comparing the first and second sets of image portions. Borza discloses adjacent sensing surfaces that are separated by small gaps, thus a complete image of the fingerprint would necessarily have gaps between the image sensors. Borza does not explicitly disclose obtaining two sets of fingerprint portions and comparing them.

Hutchison discloses taking successive images of a body part with a sensor array from different axes (or offsets) and combining the images (in order to combine the images they must be compared) to produce a representation of the object in real time (abstract and col. 2 lines 30-54).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Borza and Hutchison to take successive images with the fingerprint sensor and combine them to make a complete image of the fingerprint. The motivation for doing so is that it would fill in the inherent gaps of the fingerprint system. Thus it

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would have been obvious to one of ordinary skill in the art at the time of the invention to combine Borza and Hutchison to obtain the invention as specified in claim 13.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 6,848,617 Smart card module for biometric sensors (especially col. 4 lines 18-23).

USPN 6,307,258 Open Cavity Semiconductor Die Package.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Strege whose telephone number is (571) 272-7457. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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